

1 **IN THE UNITED STATES PATENT**
2 **AND TRADEMARK OFFICE**

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5 ***MOTORIZED CHALK LINE APPARATUS AND METHODS OF USING***
6 ***MOTORIZED CHALK LINE APPARATUS***
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9 **BACKGROUND OF THE INVENTION**
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11 1. Field of the Invention

12 The present invention relates to chalk line devices typically used to generate various
13 markings at construction sites. These devices have practical applications in the building
14 industry and the corresponding trades associated therewith. In particular, the present invention
15 is directed to motorized chalk line devices and methods of using the chalk line devices.

16 In accordance with the present invention, a spool having a wind of chalk line thereabout
17 rotates on a pair of stub axles positioned in the spool compartment. A gearing mechanism is
18 positioned about the spool or reel. And a chalk reservoir is located in proximity to the spool
19 compartment. In select embodiments, after the chalk line has been extended from the device,
20 the battery powered gearing mechanism drives the spool to reel in the chalk line. In operation,
21 when the chalk line is pulled through the chalk reservoir, it carries chalk until the chalk line is
22 snapped; thereafter, gravity pulls the loose chalk downward and onto the surface below the
23 chalk line.
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2. Description of the Previous Art

a) US Patent No. 5,444,919-Alves teaches a housing (12), drive shaft (14), spindle (16), chalk line (18), chamber (20), driven gear (22), drive gear (24), plug (26), batteries (28) and handle (30). The '919 Patent mandates through drive shaft (14) to be extended across the length of the chamber (20), as well as being mounted for rotation about its axis. Alves mounts his spindle (16) about the drive shaft (14) such that drive shaft (14) extends the entire length of the spindle (16).

b) US Patent No. 4,773,162-Lin enables a small motor (2) transmitting through the gear set (21) to a thread wheel (3), wherein the diameter of the thread wheel (3) is slightly bigger than the width of the box body (1). On the thread wheel (3) is the thread (31) which passes through the ink container (11) at the front of the box body (1). On the flange of the outer cover (12) of the ink body is a compartment to accommodate UM3 battery (4). As enabled in Fig. 1, the '162 Patent's thread wheel (3) rotates about a through axle (unnumbered).

c) US Patent No. 5,212,875-Corso teaches that the housing (100) has a compartment for the motor (102) powered by a pair of conventional batteries (104). Corso's complex gearing mechanism, includes a shaft (106) which terminates in a gear (108) which engages with and drives disc gear (110) axially connected to gear (112) for driving gear (114) mounted to splined shaft (116). The '875 splined shaft (116) is adjustable to engage the appropriate one of three disclosed drums (24, 26, and 28).

d) US Patent No. 4,189,107-Quenot, et. al., among other things, teaches a gear reduction mechanism between the electric motor and the spool carrying the measuring tape.

e) US Patent No. 4,192,078-Lore, et. al., enables a helical spring (36) for automatically returning the chalk or plumb line to the housing.

1 f) US Patent No. 4,813,145-Josey, Jr., et. al., discloses a coiled spring attached to
2 the spool for automatically retracting the chalk line.

3 g) US Design Patent No. 348,513-Syrett shows ornamental features of a chalk line
4 reel.

5 h) US Design Patent No. 314,156-Doyle shows the ornamental features of a chalk
6 line reel.

7 i) US Patent No. 6,484,412 B1-Donaldson, et. al. enables a measured refill chalk
8 cartridge (12) in combination with a manually operated chalk line.

9 j) US Patent No. 5,042,159-Millen teaches the use a spiral band spring (26) for
10 automatically retracting the chalk line into the casing (12).

11 k) US Patent No. 4,765,557-Kahmann utilizes a spiral spring (31) mechanism to
12 automatically retract the chalk line.

13 l) US Patent No. 4,592,148-Longenette enables a spiral spring (29) and clutching
14 mechanism (27) for automatically reeling in the chalk line.

15 m) US Patent No. 4,565,011-Karger discloses an automatic release for a spring
16 mechanism that is be wound to its maximum capacity such that additional lengths of chalk line
17 can be withdrawn without placing additional tension on the spring.

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SUMMARY OF THE INVENTION

Unlike traditional chalk line devices, a hand crank is conspicuously absent from the present invention. Either a disposable or rechargeable battery powers the current motorized chalk line device. And furthering ease of use, the current invention can be provided with a contact switch, sensitive to the user's touch, which activates or deactivates the drive that rotates the spool to reel in or wind the chalk line.

The present invention also uniquely embodies a spool journaled by a pair of stub axles. Thus, the current apparatus meets the long felt but unfulfilled need of providing a functional and compact structure which eliminates the cumbersome necessity of designing a single through axle or shaft to span the entire breadth of the spool chamber. And in a similar vein, practice of the present invention eliminates the awkward necessity of using a splined shaft to engage a drum's key way to rotate the drum carrying the chalk line or chalk lines.

In operation, the user unwinds the chalk line from the spool by pulling the chalk line through the chalk reservoir. Before the chalk line exists the apparatus, while passing through the chalk reservoir, it is loaded with chalk or chalk powder. When the user pulls the chalk line away from the spool for a preselected distance and then snaps the chalk line to deposit the chalk on the surface below the chalk line, a marking for the user to follow is created.

An object of the present invention is to provide a motorized chalk line apparatus.

It is another object of the present invention to enable methods of using the motorized chalk line apparatus.

1 Still another object of the present invention, as compared to the traditional hand cranked
2 chalk line devices, is to provide a motorized chalk line apparatus for quickly rewinding the
3 chalk line.

4 Yet another object of the present invention is to incorporate a pair of stub axles into the
5 spool compartment of the motorized chalk line apparatus.

6 It is yet another object of the present invention to provide a motorized chalk line
7 apparatus having a chalk reservoir of sufficient dimension to reduce the frequency of refilling
8 the chalk chamber.

9 Still another object of the present invention is to provide a motorized chalk line
10 apparatus for carrying sufficient quantities of chalk or chalk power for preselected distances,
11 i.e., until the chalk line is snapped by the user to deposit the chalk on the surface below the
12 chalk line.

13 Yet still another object of the present invention is to reduce the strain of the user by
14 elimination of the traditional hand cranks associated with chalk line devices.

15 Still another object of the present invention is to provide a motorized chalk line
16 apparatus utilizing a rechargeable battery.

17 Yet another object of the present invention is to provide a recharging base in which the
18 motorized chalk line apparatus can be placed when not in use.

19 An embodiment of the present invention can be described as a motorized chalk line
20 apparatus comprising: a housing including an aperture; a spool compartment within the
21 housing further having a first stub axle and a second stub axle; a chalk reservoir in proximity to
22 the spool compartment; a spool including a winding of chalk line; a drive; a battery for
23 powering the drive and a switch.

1 Another embodiment of the present invention can be described as a method of
2 automatically reeling in a chalk line, comprising the steps of: attaching said chalk line to a
3 spool; coupling the spool to a first and second stub axle within a spool compartment; gearing
4 the spool to engage a drive; positioning a chalk reservoir proximate an outward opening of the
5 spool compartment; supplying chalk to the chalk reservoir; linking a switch to a drive; engaging
6 the switch battery power the drive to reel in the chalk line.

7 Still another embodiment of the present device can be described as a motorized chalk
8 line apparatus comprising: a housing including an aperture; a spool compartment within the
9 housing further having a first stub axle and a second stub axle; a chalk reservoir in proximity to
10 the spool compartment; a spool including a winding of chalk line; a drive; a battery for
11 powering the drive; a switch and a contact circuit for recharging the battery.

12 It is the novel and unique interaction of these simple elements which creates the
13 apparatus and methods, within the ambit of the present invention. Pursuant to Title 35 of the
14 United States Code, descriptions of preferred embodiments follow. However, it is to be
15 understood that the best mode descriptions do not limit the scope of the present invention.

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BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 depicts a laid open view of the inside of the first side of the present invention.

Fig. 2 depicts a laid open view of the inside of the second side of the present invention.

Fig. 3 is a lateral view of the first side of the present invention.

Fig. 4 is a view of the outward side of the first side of the present invention.

Fig. 5 is a lateral view of the first side of the present invention from the opposite perspective than shown in Fig. 3

Fig. 6 is a lateral view of the second side of the present invention.

Fig. 7 is a view of the outward side of the second side of the present invention.

Fig. 8 is a schematic of the electric circuits of the present invention.

Fig. 9 is a pictorial representation of the present invention.

Fig. 10 is an illustration of the steps of an embodiment of the present method.

Fig. 11 is a depiction of the steps of another embodiment of the present invention.

Fig. 12 is an exemplification of the steps of yet another embodiment of the current method.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Although the disclosure hereof is detailed to enable those skilled in the art to practice the invention, the embodiments published herein merely exemplify the present invention.

Figs. 1 and 2 depict a laid open view of the inside of the first side (30) and the inside of the second side (50) of the motorized chalk line apparatus (20). First side (30) of housing (24) of motorized chalk line apparatus (20) has first receptacle (32) and second receptacle (34) for receiving the fasteners (shown in Figs. 6 and 7) that hold first side (30) and second side (50) of motorized chalk line apparatus (20) together. Those skilled in the art recognize that more than two fasteners can be used to hold first side (30) and second side (50) together. First side (30) includes opening (92A) and second side (50) includes opening (92B). When first side (30) and second side (50) are fastened together, among other things, aperture (92) of housing (24) is created.

First stub axle (36) extends inward from inward side (38) of first side (30). Drive (40) also extends inward from inward side (38). Second side (50) is provided with first receptacle (52) and second receptacle (54) for receiving fasteners (not shown), such as screws, to hold first side (30) and second side (50) of motorized chalk line apparatus (20) together. Second stub axle (56) extends inward from the inward side (58) of second side (50).

When first side (30) and second side (50) of motorized chalk line apparatus (20) are joined together, spool (60) and its corresponding driven gear (62) are mounted on first stub axle (36) and second stub axle (56) via a spool hollow (not shown). Wall (64A), inward side (38) of first side (30) and wall (64B), inward side (58) of second side (50) create spool chamber (66) and chalk reservoir (68). When first side (30) and second side (50) are joined together wall

1 (64A) and wall (64B) create wall (64) of spool chamber of spool chamber (66). Common
2 opening (70) joins spool chamber (66) and chalk reservoir (68) which allows the chalk line (90)
3 (shown in phantom) to unwind from spool (60). Contact switch (100) and slide (98)
4 communicate with housing (24), and slide (98) is fitted to expose or close first opening (96)
5 through which chalk can be added to chalk reservoir (68).

6 Fig. 3 is a lateral view of first side (30) of motorized chalk line apparatus (20). As
7 shown, motor (110) and battery (120) communicate with housing (24). Although not shown in
8 Fig. 3, contact switch (100), motor (110) and battery (120) are connected via the appropriate
9 circuitry. Shaft (114) extends from motor (110) through inward side (38) of first side (30) and
10 carries drive (40). As shown, drive (40) is a gear, but those skilled in the art recognize that
11 other types of drives can be utilized to practice the present invention. In this view, spool (60) is
12 coupled to stub axle (36).

13 In operation, spool (60) rotates about stub axles (36 and 56), when the chalk line is
14 pulled away from the spool or when drive (40) rotates driven gear (62) to cause the spool (60)
15 to reel in the chalk line. Chalk line (90) is wound about spool (60) and has a section extending
16 out of spool chamber (66) through common opening (70) of wall (64) into and through chalk
17 reservoir (68) and out of aperture (92) of housing (24). As best shown in Fig. 9, chalk line (90)
18 can be provided with stop (88) to prevent the tip of the chalk line from being wound about
19 spool (60). In other embodiments, the chalk line can also include an anchor (102) which allows
20 a single person to operate the present invention without the need of an assistant to hold the
21 remote end of the chalk line.

22 Fig. 4 is a view of the outward side of first side (30) of motorized chalk line apparatus
23 (20). Housing (24) can be composed of plastic or other material capable of being constructed to
24 accommodate motor (110) and battery (120). In select embodiments, the battery holder (122)

1 and the motor chamber (112) can be joined to the outside surface (26) of housing (24) via any
2 manner acceptable in the art while in other embodiments, housing (24) can be molded to
3 internally include the motor chamber (112) and battery holder (122). As shown battery holder
4 (122) of housing (24) does not include a cover for the battery (120), but in other embodiments,
5 the battery holder can encase the battery. In this particular embodiment, motor chamber (112)
6 of housing (24) is of a generally cylindrical-type design, but in accordance with the present
7 invention, motor chambers be constructed in other ways.

8 Fig. 5 is a lateral view of first side (30) of motorized chalk line apparatus (20) from the
9 opposite perspective than the view shown in Fig. 3. As portrayed in Fig. 5, the chalk line (90)
10 has been removed from the spool (60). Shaft (114) extends from motor (110) through inward
11 side (38) of first side (30) and carries drive (40). Spool (60) rotates about stub axle (36), and
12 driven gear (62) engages drive (40). Slide (98) is fitted to expose or close first opening (96).

13 Fig. 6 is a lateral view of second side (50) of motorized chalk line apparatus (20). Spool
14 (60) rotates about stub axle (56). Driven gear (62) is positioned about edge (74) of spool (60).
15 Chalk line (90) is wound about spool (60) and a section of the chalk line is extended out of
16 spool chamber (66) through common opening (70) of wall (64) into and through chalk reservoir
17 (68) and out of aperture (92) of housing (24).

18 Fig. 7 is a view of the outward side (28) of second side (50) of motorized chalk line
19 apparatus (20). First receptacle (52) receives fastener (80) and second receptacle (54) receives
20 fastener (82). Outward surface (28) is provided with contacts (84 and 86) for reciprocating with
21 a junction of the recharging base unit (not shown).

22 Fig. 8 is a schematic of the circuitry of the current motorized chalk line apparatus. Line
23 (140) runs from contact (84) (not shown) to battery (120). Line (142) travels from battery (120)
24 to contact (86) (not shown). Line (144) runs from line (140) to motor (110) while line (146)

1 connects motor (110) to contact switch (100), and line (148) runs from contact switch (100) to
2 line (142). It has been determined that a nine volt battery and its corresponding motor provide
3 adequate power to rotate the spool to return the unwound chalk line. However, those skilled in
4 the art recognize that other combinations of direct current devices for powering the spool are
5 within the scope of the present invention.

6 Fig. 9 is a pictorial representation of the present invention. First side (30) and second
7 side (50) are joined together to create housing (24) of motorized chalk line apparatus (20).
8 Battery holder (122) for battery (120) and motor chamber (112) extend outwardly from first
9 side (30). Contact switch (100) is exposed for ease of operation and a portion of chalk line (90)
10 extends outwardly from aperture (92). In this specific embodiment, chalk line (90) includes
11 stop (88) and anchor (102).

12 Steps associated with the practice of the methods of present invention utilizing select
13 structural elements enabled above are set forth in Figs. 10-12. Having disclosed the invention
14 as required by Title 35 of the United States Code, Applicant now prays respectfully that Letters
15 Patent be granted for his invention in accordance with the scope of the claims appended hereto.